Application No: 17-01-020, et al.

Exhibit No.: _____

Witnesses: Brian Warshay

OPENING TESTIMONY OF BRIAN WARSHAY ON BEHALF OF TESLA, INC ON MEDIUM/HEAVY DUTY AND FLEET CHARGING INFRASTRUCTURE

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I. INTRODUCTION

In accordance with the April 13, 2017 "Scoping Memo and Ruling of Assigned Commissioner and Administrative Law Judges," (Scoping Memo) Tesla, Inc. (Tesla) submits the testimony of Brian Warshay on Pacific Gas and Electric's (PG&E) FleetReady proposal and Southern California Edison's (SCE) Medium and Heavy-Duty Charging Infrastructure Proposal. Brian Warshay's qualifications are attached as Appendix A.

Overall, Tesla appreciates the investor owned utilities' (IOUs) incorporation of medium-duty and heavy-duty electric vehicles (MD/HD EVs) within the standard review proposals. As indicated in Tesla's reply brief on the priority review projects, in order for future growth and eventual widespread deployment to occur, significant investment in these sectors over the next several years will be necessary. Testimony below therefore focuses on a specific program implementation concern for the SCE and PG&E proposals with regards to service connections that should be addressed prior to Commission approval.

II. THE PROPOSED PROGRAM REQUIREMENT FOR NEW DEDICATED SERVICE CONNECTION FOR ALL MD/HD EV INFRASTRUCTURE SHOULD BE MODIFIED TO ALLOW CUSTOMERS AN OPTION TO UTILIZE EXISTING SERVICE CONNECTIONS

Both SCE and PG&E propose to require that new dedicated service connections be created for MD/HD EVs participating in their MD/HD infrastructure programs.[1] However, some

[1] "SCE plans to install a separately-metered circuit together with utility transformer upgrades, service drop, panel, trenching, wiring, conduit, and step-down transformer," SCE Testimony, p. 52, lines 9-11. "PG&E will design the infrastructure to provide dedicated electric service to that location by following PG&E's established procedures for new service connections. The service connection will be used exclusively for the charging infrastructure and will require dedicated meters and electric panels to the charging bank," PG&E Testimony, p. 3-12, lines 14-20.

customers that procure MD/HD EVs will be capable of charging their vehicles from the existing service provided to a facility, such as an office building or warehouse, which would reduce the amount of infrastructure the utilities must build to support the MD/HD EVs and thus reduce the overall costs of deploying the charging infrastructure.

SCE's and PG&E's proposal to require new service connections for charging infrastructure in their programs (1) restricts customer choice, (2) makes it more challenging to integrate onsite renewables and (3) would result in higher costs to ratepayers and some customers electrifying their fleets. The proposed programs, designed to encourage deployment of electric fleets, will likely see greater adoption if customers have more options with which to schedule fleet charging to minimize electricity costs. The proposed program requirement for a new service connection would restrict a customer's ability to receive utility program funding for substantial behind-the-meter infrastructure such as the conduit, wires, panel, and electric vehicle supply equipment (EVSE) if the customer chooses to install equipment behind an existing service connection. Therefore, Tesla recommends that the Commission instruct the utilities to alter their proposals to allow customers the option to charge their EVs under their existing electric service as part of the utilities' MD/HD EV infrastructure programs.

A. SCE's and PG&E's Proposal to Require New Service Connections for All MD/HD EVs Participating in Their Programs Restricts Customer Choice.

Both SCE and PG&E propose to require new service connections and separate metering for all MD/HD EVs participating in their programs.[2] However, not all MD/HD EV charging will require new service connections. In some cases, MD/HD EV owners will have facilities with remaining capacity on their existing service connections, particularly if they are large facilities

[2] *Ibid.*

like factories or warehouses. For these sites, customers' decisions between rate options, charging schedules, and infrastructure deployment (i.e., number of chargers on a site) can make or break a business case for a fleet deployment. Limiting rate options and the ability to choose how infrastructure is connected due to relatively arbitrary program limitations reduces a customer's flexibility and ability to deploy the most cost-effective charging capabilities. Most commercial and industrial facilities with EVs will schedule charging (1) to avoid the facility's peak demand and (2) during off peak energy rate periods because of clear price signals from existing rate structures. Customers that have remaining capacity on their existing service connection or are able to charge EVs dynamically to avoid needing a new service connection should not be required to have dedicated new service connections to participate in the utilities' MD/HD EV programs.

B. Requiring New Service Connections as a Prerequisite for Program Funding Would Make it More Challenging for Customers to Optimize Onsite Renewable Generation and Storage.

Customers electrifying their fleets may also consider incorporating renewable generation and storage onsite to offer clean electricity to fuel EVs. Requiring new service connections, metering, and rate plans for the charging infrastructure separate from the building may end up reducing the overall benefits of a solar and storage system to the customer due to a suboptimal system design, suboptimal tariff optimization, and additional administrative costs. Typically, a solar and storage system is designed to maximize savings (or minimize costs) associated with a load forecast and utility rate tariff. Separate metering for a building and charging infrastructure may require project development, design, sizing, and interconnection for *two* systems based on *two* load profiles on *two* rates rather than one, significantly complicating the project and likely resulting in higher overall costs. A single solar and storage system serving a combined building

and charging load could share resources and benefit from the economies of scale of having a single large system rather than two smaller systems.

C. Allowing MD/HD EV Charging on Existing Service Connections Will Result in Lower Costs to Ratepayers and Lower Costs for EV Charging.

It is important to allow customers to utilize their existing service connections for EV charging when there is capacity on the service connection because it is less expensive both for ratepayers funding and the customers utilizing the MD/HD EV programs.

Ratepayer Savings: The cost of new service connections is quite significant – of the $11.6 million in capital that PG&E proposes to spend on HD Truck and Transit Buses $7.4 million, or 64%, is for the service connection.[3] Allowing MD/HD EV operators to fully utilize existing service connections when possible is a more efficient use of infrastructure than requiring the utility build out new service connections due simply to program design. This will streamline the use of ratepayer funds to provide the most value to the overall market to spur MD/HD EV adoption.

Customer Savings: Allowing the EV charging infrastructure to take service under facilities' existing service connections provides customers with more options to reduce their charging costs thus improving the economics of switching from fossil fuel to electric vehicles. Some customer buying MD/HD EVs will have the flexibility to minimize the overall cost of charging by scheduling vehicle charging to have the least impact on the demand portion of the facility utility bill. This can be done by scheduling charging at times when it is not coincident with their facility's peak demand. By minimizing the demand charge impact, the incremental

[3] PG&E Data Request Response to Office of Ratepayer Advocates: FleetReady Workpapers, April 24, 2017, at 4A-4B.

cost of charging MD/HD EVs will be only the variable energy cost of electricity paid for a $/kWh basis. This would make charging in most cases much less expensive than if the customer had to pay an additional demand charge on the account of the new service connection.

Smart charging schedules will increase site load factors while limiting the impact on peak demand. This will result in higher utilization of existing utility infrastructure and lower charging costs to both the individual customers participating in the programs as well as all customers who are funding the programs.

D. The Commission Should Direct SCE and PG&E to Allow MD/HD EVs to Participate in Their MD/HD EV Infrastructure Programs Under Existing Service Connections.

The Commission should direct SCE and PG&E to alter their programs to allow customers that want to install MD/HD EV charging infrastructure on an existing service connection to participate in the utilities' MD/HD EV infrastructure programs. Absent such a change, the utilities' MD/HD EV infrastructure deployment will be less economically efficient due to an administrative program requirement rather than a business or system need. This subtle change will offer customers more options to optimize the charging schedule of their MD/HD EVs, create more opportunities for the integration of onsite renewable generation and storage, and reduce costs to ratepayers and site owners alike resulting in greater deployment of electrified fleets.

III. CONCLUSION

With the modifications recommended in Section II of this testimony, PG&E and SCE MD/HD proposals will be improved to help meet the statutory objectives of Senate Bill (SB) 350 and the September 14, 2016 Assigned Commissioner Ruling (ACR) in Rulemaking (R.) 13-11-007.

Respectfully submitted,

/s/ Brian Warshay

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APPENDIX A – STATEMENT OF QUALIFICATIONS FOR BRIAN WARSHAY

Brian Warshay is a Senior Analyst on Tesla's Product Economics and Grid Services team. His work focuses on the value of distributed grid resources, retail rate reform, and smart energy home devices, including solar and battery storage to support Tesla's ongoing efforts to deploy distributed energy resources that can provide grid services. Previously, Brian led the North American Energy Smart Technologies team at Bloomberg New Energy Finance and the Grid Storage team at Lux Research. Brian received his master's degree in Engineering Systems and Management at the Masdar Institute in Abu Dhabi, and undergraduate degrees in Natural Resources and Environmental Engineering Technology at Cornell University.